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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/595,156

03/08/2006

Fritz Schwertfeger

WAS0763PUSA

3474

22045

7590

05/12/2008

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EXAMINER

HAUTH, GALEN H

ART UNIT

PAPER NUMBER

4111

MAIL DATE

DELIVERY MODE

05/12/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/595,156	Applicant(s) SCHWERTFEGER ET AL.	
	Examiner GALEN HAUTH	Art Unit 4111	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 14-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 14-36 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>3/23/2006</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 25 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding this claim, the phrase "particularly preferably" renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 14-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schwertfeger et al. (Pub No. 2003/0104920) in view of Costantini et al. (WO 02/40182) and Krause et al. (Pub No. 2003/0001313).

a. With respect to claim 14, Schwertfeger teaches a method for sintering an amorphous, porous silicon dioxide preform with laser radiation (abstract).

Schwertfeger teaches that the silicon dioxide article is useful for a crucible for pulling silicon single crystals (§ 0005), and is sintered at a temperature range of 1000 to 2500 degrees Celsius (§ 0021) preferably in the form of a crucible (§ 0015). Schwertfeger fails to teach coating a green silicon dioxide preform with silicon nitride and laser sintering them to form a silicon nitride sintered layer.

b. Costantini teaches using a liquid powder dispersion coating technique to apply a layer of coating to crucibles (abstract) in which the crucibles are made of quartz (pg. 1 ln 16-19, quartz is silicon dioxide) and the coating is silicon nitride powder (pg. 10 ln 27). After coating the crucible with silicon nitride the article is

sintered by placing it in an environment where the temperature is 1095 degrees Celsius (pg. 11 ln 25-31). The purpose of coating the crucible with silicon nitride is to improve the release characteristics of the crucible (pg. 6 ln 4-11) which is important because "it is known in the art that a release coating applied to the inside of the crucible in the area of contact with the ingot can prevent the reaction between silicon and quartz that leads to ingot contamination and cracking." (pg. 2 ln 1-3). Krause teaches using a laser beam to sinter a silicon nitride ceramic (§ 0002 & 0026) and further teaches that it is known in the art to sinter-fuse powder layers onto a green body using carbon dioxide lasers (§ 0007). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the coating methods of Costantini to apply a liquid powder coating of silicon nitride to the amorphous, porous silicon dioxide green body of Schwertfeger and sinter the resulting article with laser radiation, because as noted above: a) Costantini teaches providing sintered silicon nitride to quartz crucibles to enhance a release property of the crucibles to thereby prevent ingot contamination and cracking, and further teaches sintering silicon nitride at a temperature of around 1095 degrees Celsius which falls within an amorphous, porous silicon dioxide sintering temperature of around 1000 to 2500 degrees Celsius suggested by Schwertfeger et al; and, b) application of a laser sintering is an art recognized effective technique for sintering silicon nitride and also for sinter fusing powder layer on a green body using a laser as exemplified in the teachings of Krause.

c. With respect to claims 15 and 16, Schwertfeger teaches that the laser sintering method uses a carbon dioxide laser (§ 0014), the product formed is a crucible (§ 0005), and the precursor would be applied to the inside of the article given that it is a release coating for an object to be molded within.

d. With respect to claims 17-22, Costantini teaches coating using silicon nitride powder with an average particle size of .7 microns (pg. 10 ln 27-31), wherein the coating is applied through spraying the inside of the crucible and then allowing the coating to dry through evaporation of water (pg. 10 ln 14-19).

e. With respect to claims 23-26, Schwertfeger teaches using a carbon dioxide laser for sintering which has a focal spot diameter of at least 2 cm, a power density of 50 W to 500 W, carrying out the irradiation uniformly and continuously (§0016), and is sintered at a temperature range of 1000 to 2500 degrees Celsius (§ 0021). In addition, Costantini also teaches sintering a crucible with silicon nitride by heating it at a temperature of 1095 degrees Celsius (pg. 11 ln 25-31)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GALEN HAUTH whose telephone number is (571)270-

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5516. The examiner can normally be reached on Monday to Thursday 7:30am-5:00pm ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sam Yao can be reached on (571)272-1224. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/GHH/

/Sam Chuan C. Yao/
Supervisory Patent Examiner, Art Unit 4111